MBA

(SEM II) THEORY EXAMINATION 2023-24
QUANTITATIVE TECHNIQUES FOR MANAGERS

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Explain the importance of Quantitative techniques in decision making.	02	1
b.	A decision-maker is faced with three investment options: Investment A, Investment B, and Investment C. The payoffs for these investments under different market conditions (Good, Fair, Poor) are given in the following payoff matrix. Apply the Maximax criterion to determine which investment the decision-maker should choose.	02	1
c.	What is an unbalanced transportation problem.	02	2
d.	Write the dual of the given primal linear programming problem Maximize Z=3x1+5x2 STC 2x1+3x2 ≤ 8 4x1+x2 ≤ 7 & x1, x2 ≥ 0	02	2
e.	Write the formula for calculating value of the game in a mixed strategy game.	02	3
f.	What is maximization case in Assignment model.	02	3
g.	Students arrive at the head office of Universal Teacher Publications according to a Poisson input process with a mean rate of 40 per hour. The time required to serve a student has an exponential distribution with a meanof 50 per hour. Assume that the students are served by a single individual, find the average waiting time of a student.	02	4
h.	Explain the Processing of n jobs through m machines.	02	4
i.	Explain significance of replacement models.	02	5
j.	Discuss the significance of merge and burst events.	02	5

	Good Market	**Fair Market**	**Poor Market**
Investment A	100	50	-20
Investment B	80	60	40
Investment C	120	20	-30

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

a.	What is decision theory? Outline various types of decision-making environment.	10	1
b.	Solve the following LPP by graphical method. Minimize Z = 20x1+10x2 STC x1+2x2 ≤ 40 3x1+x2 ≥ 30 4x1+3x2 ≥ 60 &	10	2

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$x1, x2 \geq 0$

c. There are five jobs to be assigned, one each to five machines and the associated cost matrix is as follows. Solve this minimal assignment problem. — 10 — 3

Job	1	2	3	4	5
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	15

Explain the concept of a queuing and discuss the key components. Also provide examples of real-world applications where queuing theory is utilized to optimize efficiency and customer satisfaction. — 10 — 4

Draw the network and find the critical path and the critical time from the given data — 10 — 5

Jobs	1-2	1-3	2-4	3-4	3-5	4-5	4-6	5-6
Duration (in days)	6	5	10	3	4	6	2	9

SECTION C

3. **Attempt any *one* part of the following:** **1 x 10 = 10**

a. "Operation research can be considered a discipline, a profession, a collection of techniques, or even a philosophy. "Discuss the statement by explaining techniques of OR. — 10 — 1

b. A newspaper hawker must decide how many newspapers to purchase each day. Each newspaper costs Rs.0.50/- and sells for Re 1.00/-. Unsold newspapers have no salvage value. The demand for newspapers varies daily according to the following probability distribution. Determine the optimal number of newspapers the hawker should purchase to maximize their expected profit. — 10 — 1

Number of Newspapers	10	20	30	40
Probability	0.1	0.3	0.4	0.2

4. **Attempt any *one* part of the following:** **1 x 10 = 10**

a. "Linear Programming has no real-life applications". Do you agree with this statement. If No Justify your answer. — 10 — 2

b. Determine the initial basic feasible solution of the given transportation problem using Vogel's approximation Method (VAM) and hence find the optimal solution. — 10 — 2

	D1	D2	D3	D4	Supply
O1	6	4	1	5	14
O2	8	9	2	7	16
O3	4	3	6	2	5
Demand	6	10	15	4	35

5. **Attempt any *one* part of the following:** **1 x 10 = 10**

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a.	Illustrate Hungarian Algorithm and write its application in decision making.	10	3
b.	Solve the game by using the principle of dominance.	10	3

	Player B			
Player A	1	7	3	4
	5	6	4	5
	7	2	0	3

6. Attempt any *one* part of the following: 1 x 10 = 10

a.	There are six jobs which must go through two machines A and B Processing time in hours is given below:	10	4

JOB	1	2	3	4	5	6
A	8	19	11	12	16	20
B	7	5	2	14	3	9

Evaluate the total elapsed time and the idle time for both machines A & B

b.	Assess the basic characteristics of a Queue System. Also discuss customer's behavior in a queue.	10	4

7. Attempt any *one* part of the following: 1 x 10 = 10

a.	A machine costs Rs. 10,000/-. It's operating and resale values are given below. Determine at what time the machine should be replaced.	10	5

Year	1	2	3	4	5	6	7	8
Operating Cost	1000	1200	1400	1700	2000	2500	3000	3500
Resale Value	6000	4000	3200	2600	2500	2400	2000	1600

b.	Distinguish between CPM and PERT. Also explain how total float is calculated from the network diagram.	10	5

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